Studies on the Life Cycle and Propagation Technique of Montandoniola Moraguesi (Puton) (Heteroptera: Anthocoridae)

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INTRODUCTION

During the latter part of January, 1964, an infestation of Cuban-laurel thrips, *Gynaikothrips ficorum* (Marchal) on Chinese banyan trees, *Ficus retusa* L., was discovered at the Honolulu International Airport. *G. ficorum* is a pest of banyan trees in California, Mexico, Florida, Spain, Puerto Rico, Cuba, Canary Islands, Madeira Islands, Egypt, Palestine, Algeria, Uganda, China, India and Java and bites people. Within a month, the Cuban-laurel thrips was found in scattered areas on Oahu, infesting the Benjamin tree, *Ficus benjamina* L. as well as *F. retusa*, and by November, 1964 it was found on all major islands.

An important thrips predator in Arizona, an anthocorid *Orius tristicolor* White, was released in May, 1964 to assist a local thrips predator, *O. perse-quens* (White), to combat the Cuban-laurel thrips. No recoveries have been made of *O. tristicolor*.

In June 1964, *Montandoniola moraguesi* (Puton) was received from Manila, Philippines. After mass propagation in the insectary, *M. moraguesi* was liberated throughout Oahu and became established quickly. This predacious insect was released later on Kauai. Although no releases were made on Maui, Hawaii and Molokai, it was found subsequently on these islands on May 7, 13, and November 18, 1965, respectively.

Due to effective predation by *M. moraguesi*, considerable reduction in thrips population was noticed on all five islands of Hawaii.

PROCEDURE

The life cycle of *M. moraguesi* was studied in the Entomology Insectary from October 1 to December 30, 1964.

Two pairs of newly transformed adult anthocorids were placed in each of 8 cloth-covered glass tumblers. All stages of *Gynaikothrips ficorum* on *Ficus retusa* leaves were placed in the tumblers for food. The twisted leaves were sectioned to permit feeding observations.

Bouquets of *F. retusa* inserted in small water-filled glass vials plugged with cotton for oviposition were placed inside the tumblers.

LIFE CYCLE

The preoviposition period of this anthocorid varied from 3–5 days.

Mating was observed during the first two days after adulthood was attained. The eggs, cream colored, 0.6 × 0.2 mm, are inserted singly and slantingly under the epidermis of young stems and petioles and under the epidermis of both surfaces of uninfested and infested banyan leaves. Each egg has a white, ring-like egg cap or operculum.

Upon hatching in 4–6 days, the 1st instar nymphs are almost transparent except for 3 red markings on the dorsal surface of their abdomen. The 1st and 2nd instar nymphs feed on eggs and young nymphs of *G. ficorum*. Nymphs in the 3rd, 4th and 5th instars were observed feeding on the adults as well as eggs and nymphs by inserting their beaks into the host. They would feed until the body contents were extracted.

Each of the 5 nymphal stadia is approximately 3 days, 13–16 days combined. Last instar nymphs measure 2.0 to 2.5 mm × 1.0 mm wide. The nymphal instars generally range from yellowish-white in the 1st to dull orange in the last. Immediately following ecdysis, 3rd, 4th, and 5th instar nymphs are bright orange.

The young adults (both sexes) change from light pink to brown to black within 3 hours. Males measure 2.0 × 1.0 mm and females measure 2.5 × 1.2 mm. The adults were observed feeding on all stages of *G. ficorum*. In captivity, adult longevity varied considerably; however, 40 days was the average.

A complete life cycle of *M. moraguesi* requires 17–22 days as follows:

Duration of: Egg stage	4– 6 days
Nymphal stage	13–16 days
Total	17–22 days
Preoviposition period	3– 5 days

PROPAGATION TECHNIQUE

Place 70–80 adult *M. moraguesi* in a clean, wide-mouthed gallon jar placed horizontally and containing 2 small bouquets of *F. retusa* infested with *G. ficorum* for food. The jar is covered with organdy cloth and secured. Water is sprinkled in the jars daily and fresh food provided every 3 days. Old bouquets are not removed at this time since they may contain *M. moraguesi* eggs. When 1st instar nymphs of *M. moraguesi* are observed, the adult predators are removed and transferred. As nymphs begin to mature, the old bouquets are removed and replaced with fresh ones. The jars are shaken to loosen predators clinging to stems and leaves before removal. All dry leaves are checked before discarding.

At least half of the 3rd and 5th instars are collected and placed in another jar whenever over-crowding occurs.

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